



August 15, 2016

Mr. Ronald Ellis
4610 North College Road
Castle Hayne, NC 28429

**Re: Laboratory Report of Findings
Soil Gas Testing
Daikin Applied Americas, Former Heatcraft Facility
Sunnyvale Drive, Wilmington, NC
NC 057 451 270
CORR PN 3080 (16)**

Mr. Ellis:

CORR Environmental Resources, Inc. on behalf of Daikin Applied Americas Inc (DAA) is submitting the Laboratory Findings concerning the soil gas testing conducted on your properties located at 133 and 135 Chula Vista Drive (CVD), Wilmington, NC in late July 2016.

Background Information

The soil gas sampling was conducted to determine if latent degreasing solvent vapors were present in surface soils adjacent to the two residential structures on your property. The testing was conducted consistent with a requirement from the North Carolina Department of Environmental Quality (NCDEQ) as the Division of Waste Management (DWM) to investigate potential soil vapors as a component of site investigation of historic solvent usage at Daikin Applied's former property located at 602 Sunnyvale Drive (referred to as the former Heatcraft site). The solvent degreasing operations were discontinued in the late 1980's and the facility was sold in the early 1990's. Chlorinated solvents have not been used on the property since then. The property is now owned by a business not associated with Daikin Applied.

The primary degreasing solvent used during former manufacturing of heating, air conditioning and ventilation (HVAC) equipment was Trichloroethene (TCE) and 1,1,1 Trichloroethane (TCA). The presence of these solvents has been and continues to be assessed and the property has been undergoing extensive corrective actions in reference to groundwater impacts since the 1990s. Groundwater remains impacted with concentrations of TCE and TCA and other organic constituents as the solvent has degraded in the groundwater. These common degradation constituents included Dichloroethene and vinyl chloride. These constituents are what are termed the Chemicals of Concern (or COC's) for the soil gas investigation.

Sampling Methods

The sampling was conducted by advancing two hand dug boreholes to approximately three-feet (3-ft) below ground surface (bgs) adjacent to the two residential structures on the property.

The open boreholes were then fitted with 6-inch length, stainless steel wire sample screens attached to inert low density polyethylene tubing extended above the ground surface. The wire screen inlets were then backfilled with small diameter glass beads to approximately 3-inches above the wire screen. The remaining borehole was then backfilled with granular clay to effectively seal the wire screen from ambient surface air.

Prior to sample collection stagnant air was purged from the outlet tubing using an organic vapor meter pump. Once the tubing was purged, the tubing was temporarily sealed and then attached to a laboratory prepared vacuum canister. The outlet tubing soil gas flow rate was regulated by a valve assembly and confirmed by a pressure gauge on the canister(s). The operating canister(s) were then left in place for an approximate two-hour time period.

Once the approximate two-hour sampling period was completed, the sample canister was sealed and properly removed from the outlet tubing. The canister was then labeled with sampling start and stop times, the initial and final pressure readings on the gauge and ambient temperature and barometric pressure. The wire screens and outlet tubing materials were then removed from the boreholes and the locations returned to previous grade. The canisters were then submitted to Test America laboratory for independent analytical testing using appropriate Chain of Custody documents.

Testing Results

The DWM utilizes benchmark concentrations of various compounds with what is termed Vapor Intrusion Screening Concentrations (VISC's) for residential locations in regard to the organic constituents reported by the Test America laboratory. The laboratory data report indicated the presence of very low values for TCE, as the primary Chemical of Concern at the former Heatcraft property. The concentrations indicated TCE at 5.2 $\mu\text{g}/\text{M}^3$ [micrograms per cubic meter] at 133 CVD and 0.75 $\mu\text{g}/\text{M}^3$ at 135 CVD. The microgram per cubic meter is an approximately equal to parts per billion in air.

The DWM residential VISC uses a screening benchmark of 13.9 $\mu\text{g}/\text{M}^3$ as the baseline concentration for exterior soil gas levels (updated March 2016). This baseline concentration for TCE takes into account a toxicological evaluation of relative risk factors for exterior soil gas concentrations published by the USEPA.

Other site related organic (COC's) indicated at low concentrations in the laboratory testing report are listed below for 133 and 135 CVD respectively;

- 1,1,1 TCA at 1.1 and <0.25 (less than) $\mu\text{g}/\text{M}^3$ [VISC benchmark 34,800 $\mu\text{g}/\text{M}^3$]
- 1,2,4 trimethylbenzene at 13 and 13 $\mu\text{g}/\text{M}^3$ [VISC benchmark 48.7 $\mu\text{g}/\text{M}^3$]
- Cis-1,2 dichloroethene at <0.14 and 0.17 $\mu\text{g}/\text{M}^3$ [no published VISC]

Published environmental information describes trimethylbenzene as a hydrocarbon based liquid. Trimethylbenzene can be used as a solvent, paint thinner or in plastics. It is reportedly released to the environment as a component of gasoline and emissions from gasoline engines, from waste water treatment plants and from coal fired power plants. TCA and cis-1,2 dichloroethene are site related chemicals either from solvent usage or natural degradation of the TCE solvent in groundwater.

These data were submitted to the DWM for their evaluation using risk calculation model for residential settings. The risk calculations included TCE, TCA and 1,2,4 trimethylbenzene; cis-1,2 DCE was not included in the risk calculations. The risk calculations, as reported to CORR and Daikin Applied, resulted in the following comment:

- 'The calculated cumulative risk ($3.3E-7$ or 0.0000033) is less than the DWM criteria of $1E-4$ (0.0001). The hazard quotient ($1.73E-1$ or 0.173) is less than the DWM criteria of 1.'

These data indicate the vapor intrusion risk does not exceed the benchmark calculations for residential settings. At this time the DWM is not requiring any additional soil gas testing for your property. The conclusion will however remain as long as current shallow groundwater concentrations remain stable or are declining in area test wells. The DWM added if an increase in COC concentrations is observed in future groundwater testing, they retain the right to require additional testing and a re-evaluation of potential risks.

All other volatile constituents as site related COC's on the laboratory report are either below or less than the laboratory Detection Limits (<DL), are considered not present in the soil gas sample or do not pose a risk per the VISC values. The focus of the soil gas and groundwater investigations and remediation primarily remains the TCE constituent.

The attached Table presents the full analytical summary and provides the residential VISC benchmarks for reference.

Conclusions

The 5.1 and $0.75 \mu\text{g}/\text{M}^3$ concentrations of TCE indicated in the laboratory report does not exceed the residential VISC benchmark of $13.9 \mu\text{g}/\text{M}^3$ nor do they factor unacceptable risk to residential settings. As previously stated, no further soil gas testing has been required at this time by the DWM. The DWM can or may however require additional testing to confirm these initial results in the future. If the DWM does in the future require additional testing, Daikin Applied will contact you directly.

A formal Report of Findings regarding the soil gas testing will be submitted, along with this letter, to the DWM for review and guidance. The DWM may then provide direction to Daikin Applied and you if additional actions are warranted based on their assessment directives. Please let me know if you would like a copy of the report to the DWM sent to you.

For questions regarding the DWM project oversight contact Mary Siedlecki at the following:

- NCDEQ Project Manager – Mary Siedlecki 919-707-8208 or email at mary.siedlecki@ncdenr.gov

Reference the DWM project number NC 057 451 270 and/or the former Heatcraft site in Wilmington.

If there are any questions regarding the enclosed report or other issues related to the sampling, please contact me at 972-523-0487 or email at corrieri@verizon.net.

Cordially,

CORR Environmental Resources, Inc.



Raymond Roblin, P.G.
Principal

Cc: Ms. Mary Siedlecki, NCDEQ, Division of Waste Management
Mr. Paul Heim, DAA

Enclosure

SUMMARY OF ANALYTICAL

Client ID	133 CVD SG3			135 CVD SG4			
Lab Sample ID	200-34491-3			200-34491-4			
Sampling Date	07/20/2016 14:10:00			07/20/2016 14:20:00			
Matrix	Air			Air			
Dilution Factor	1			1			
Unit	ug/m3			ug/m3			ug/m3
AIR - GC/MS VOA-TO-15-UG/M3	Result	Q	MDL	Result	Q	MDL	VISC
AIR BY TO-15							
1,1,1-Trichloroethane	1.1		0.25	ND	U	0.25	34,800
1,1,2,2-Tetrachloroethane	ND	U	0.30	ND	U	0.30	NL
1,1,2-Trichloroethane	ND	U	0.21	ND	U	0.21	1.39
1,1-Dichloroethane	ND	U	0.10	ND	U	0.10	585
1,1-Dichloroethene	ND	U	0.14	ND	U	0.14	139
1,2,4-Trichlorobenzene	ND	U	0.50	ND	U	0.50	13.9
1,2,4-Trimethylbenzene	13		0.21	13		0.21	48.7
1,2-Dibromoethane	ND	U	0.30	ND	U	0.30	1.56
1,2-Dichlorobenzene	ND	U	0.33	0.35	J	0.33	1,390
1,2-Dichloroethane	ND	U	0.17	ND	U	0.17	36
1,2-Dichloroethene, Total	ND	U	0.14	0.17	J	0.14	NL
1,2-Dichloropropane	ND	U	0.12	ND	U	0.12	27.8
1,2-Dichlorotetrafluoroethane	ND	U	0.27	ND	U	0.27	NL
1,3,5-Trimethylbenzene	3.0		0.19	2.9		0.19	NL
1,3-Butadiene	ND	U	0.20	ND	U	0.20	13.9
1,3-Dichlorobenzene	ND	U	0.33	ND	U	0.33	NL
1,4-Dichlorobenzene	0.54	J	0.34	0.78	J	0.34	85.1
1,4-Dioxane	ND	U	2.0	ND	U	2.0	187
2,2,4-Trimethylpentane	ND	U	0.18	3.4		0.18	NL
2-Chlorotoluene	ND	U	0.17	ND	U	0.17	NL
3-Chloropropene	ND	U	0.21	ND	U	0.21	NL
4-Ethyltoluene	3.2		0.22	3.0		0.22	NL
4-Isopropyltoluene	2.6		0.20	1.2		0.20	NL
Acetone	33		2.0	20		2.0	21,600
Benzene	0.76		0.13	1.7		0.13	120
Benzyl chloride	ND	U	0.27	ND	U	0.27	6.95
Bromodichloromethane	ND	U	0.20	ND	U	0.20	25.3
Bromoethene(Vinyl Bromide)	ND	U	0.19	ND	U	0.19	20.9
Bromoform	ND	U	0.58	ND	U	0.58	
Bromomethane	ND	U	0.22	ND	U	0.22	851

Carbon disulfide	9.9		0.13	1.8		0.13	4,870
Carbon tetrachloride	0.23	J	0.20	0.30	J	0.20	156
Chlorobenzene	0.35	J	0.23	0.43	J	0.23	348
Chloroethane	0.89	J	0.22	ND	U	0.22	NL
Chloroform	11		0.40	0.55	J	0.40	NL
Chloromethane	2.4		0.19	1.3		0.19	626
cis-1,2-Dichloroethene	ND	U	0.14	0.17	J	0.14	NL
cis-1,3-Dichloropropene	ND	U	0.10	ND	U	0.10	139
Cumene	0.71	J	0.15	ND	U	0.15	2,780
Cyclohexane	0.19	J	0.13	ND	U	0.13	4,870
Dibromochloromethane	ND	U	0.37	ND	U	0.37	NL
Dichlorodifluoromethane	1.8	J	0.40	1.9	J	0.40	695
Ethylbenzene	3.5		0.14	2.5		0.14	374
Freon 22	0.42	J	0.20	0.62	J	0.20	NL
Freon TF	ND	U	0.57	ND	U	0.57	NL
Hexachlorobutadiene	ND	U	0.87	ND	U	0.87	42.5
Isopropyl alcohol	9.1	J	2.4	23		2.4	NL
m,p-Xylene	10		0.31	8.6		0.31	695
Methyl Butyl Ketone (2-Hexanone)	1.0	J	0.23	0.76	J	0.23	209
Methyl Ethyl Ketone	6.8		0.15	4.9		0.15	3,480
methyl isobutyl ketone	1.2	J	0.20	0.92	J	0.20	2,090
Methyl methacrylate	ND	U	0.16	ND	U	0.16	NL
Methyl tert-butyl ether	ND	U	0.32	ND	U	0.32	3,600
Methylene Chloride	ND	U	0.63	1.2	J	0.63	4,170
Naphthalene	0.85	J	0.30	4.2		0.30	21
n-Butane	0.67	J	0.19	2.0		0.19	
n-Butylbenzene	1.8		0.26	2.1		0.26	NL
n-Heptane	1.4		0.16	ND	U	0.16	NL
n-Hexane	0.49	J	0.19	1.7		0.19	48,700
n-Propylbenzene	2.1		0.21	2.1		0.21	6,950
sec-Butylbenzene	ND	U	0.24	ND	U	0.24	NL
Styrene	2.5		0.18	2.6		0.18	6,950
tert-Butyl alcohol	2.9	J	2.6	ND	U	2.6	NL
tert-Butylbenzene	ND	U	0.24	ND	U	0.24	NL
Tetrachloroethene	1.2	J	0.16	0.25	J	0.16	278
Tetrahydrofuran	ND	U	4.1	10	J	4.1	13,900
Toluene	9.8		0.35	12		0.35	34,800
trans-1,2-Dichloroethene	ND	U	0.17	ND	U	0.17	NL
trans-1,3-Dichloropropene	ND	U	0.15	3.3		0.15	NL
Trichloroethene	5.2		0.21	0.75	J	0.21	13.9
Trichlorofluoromethane	1.0	J	0.21	1.1		0.21	NL
Vinyl chloride	ND	U	0.082	ND	U	0.082	76.8
Xylene (total)	15		0.16	13		0.16	695
Xylene, o-	4.4		0.16	3.8		0.16	695
Client ID			133 CVD SG3			135 CVD SG4	

B : Compound was found in the blank and sample.

J : Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

U : Indicates the analyte was analyzed for but not detected.

VISC - Division of Waste Management Residential Vapor Intrusion Screening Concentrations (March 2016)

Green shading are site related Chemicals of Concern

Orange shading show concentrations above lab reporting limits, below VISC benchmarks

ND = Not Detected above lab reporting values or limits